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ABSTRACT

The probabilities of attaining varying magnitudes of standardized effect sizes by chance and when protected by a 0.05 level statistical test were studied. Monte Carlo procedures were used to generate standardized effect sizes in a one-way analysis of variance situation with 2 through 5, 6, 8, and 10 groups with selected sample sizes from 5 to 500. Within each of the 91 group and sample size configurations, 100,000 replications were generated from a distribution of normal deviates. For each data set, the effect size was computed along with a statistical test of the hypothesis at the 0.05 level. For each n/k combination, the proportion of effect sizes exceeding 0.1 to 2.0 in increments of 0.1 was computed for all cases and for those cases where "the no difference hypothesis" was rejected. There were trends that were common across all configurations. As the magnitude of effect size increased, the probability of getting such a difference by chance decreased, as would be expected. Within a given number of samples situation, as sample size increased, as expected, the probability of getting such a difference by chance decreased. Within a given sample size, as the number of groups increased, the probability of getting such a difference by chance increased. Another finding that was consistent across all configurations was that the significance test protected effect size probability was always equal to or less than the unprotected probability, in some cases dramatically so. It was clear that the addition of the significance test reduced the probability of finding a seemingly large effect size by chance. Such a protected effect size indicator could be an answer to the arguments posed by both those who protest against the use of the significance test and those who propose its use in judging the magnitude of an observed effect. (Contains 15 tables, 14 figures, and 43 references.) (Author/SLD)

Avoiding Decision-Making by Chance: Protecting Effect Size Estimates

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Abstract

Cohen's popular book titled *Statistical Power Analysis for the Behavioral Sciences,* coupled with recent challenges to statistical significance, has made "effect size" one of the hottest methodological topics of our time. Cohen recommends specific levels of effect size for "small," "medium," and "large" effects. However, even Cohen acknowledged these values are relative to the specific content and method in a given research situation. The purpose of this study is to determine the probabilities of attaining varying magnitudes of standardized effect sizes by chance and when protected by a .05-level statistical test.

Monte Carlo procedures were used to generate standardized effect sizes in a one-way ANOVA situation with 2 through 5, 6, 8, and 10 groups having selected sample sizes from 5 to 500. Within each of the 91 number of group and sample size configurations, 100,000 replications were generated from a distribution of normal deviates. For each data set, the effect size was computed along with a statistical test of hypothesis at the .05 level. For each n/k combination, the proportion of effect sizes exceeding 0.1 to 2.0 in increments of .1 was computed for all cases and for those cases where the no difference hypothesis was rejected.

There are trends that are common across all configurations. As the magnitude of effect size increases, the probability of getting such a difference by chance decreases as would be expected. Within a given number of samples situation, as sample size increases, as expected, the probability of getting such a difference by chance decreases. Within a given sample size, as the number of groups increases the probability of getting such a difference by chance increases. Another finding which is consistent across all configurations is that the significance test protected effect size probability is always equal to or less than the unprotected probability, in some cases dramatically so. It is clear that the addition of the significance test reduces the probability of finding a seemingly large effect size by chance. Such a protected effect size indicator could be an answer to the arguments posed by both those who protest against the use of the significance test and those who propose its use in judging the magnitude of an observed effect.

Avoiding Decision-Making by Chance: Protecting Effect Size Estimates

Cohen's popular book titled *Statistical Power Analysis for the Behavioral Sciences,* coupled with recent challenges to statistical significance, has made "effect size" one of the hottest methodological topics of our time. The primary alternative that has been recommended to statistical hypothesis testing is the use of effect sizes (e.g., Carver, 1978, 1993; Nix & Barnette, 1998). Cohen recommends specific levels of effect size for "small," "medium," and "large" effects. However, even Cohen acknowledged these values are relative to the specific content and method in a given research situation (Cohen, 1988). The purpose of this study is to determine the probabilities of attaining varying magnitudes of standardized effect sizes by chance and when protected by a .05-level statistical test. Results should provide empirical evidence of the wisdom of reporting an effect size estimate without first conducting a statistical test of the hypothesis.

Background

The concept of effect size has been around for many years. Cohen (1969) is generally credited with coining the term. However, the development of meta-analysis by Glass, Rosenthal and others in the 1970s (e.g., Glass, 1976; 1978; Glass & Hakstian, 1969; Rosenthal, 1976, 1978) and the popularity of a book on meta-analysis in 1981 (Glass, McGaw, & Smith) are the catalysts for the interest in the concept. Numerous publications followed on applications of effect size methodology (e.g., Lynch, 1987; McLean, 1983), methods for estimating effect size and its properties (e.g., Fowler, 1988; 1993; Gibbons, Hedeker, & Davis, 1993; Hedges, 1981, 1984; Huynh, 1989; Kraemer, 1983; Reichhardt & Gollob, 1987; Thomas, 1986), extracting effect size estimates from existing studies (e.g., Hedges, 1982; Snyder & Lawson, 1993), and correcting effect size estimates (Snyder & Lawson, 1993). Another book by Wolf (1986), a general methodology for conducting meta-analysis, included the extraction and testing of effect sizes.

Perhaps no one has had a greater impact on the use of effect sizes than Cohen (1988) through his books on power analysis. In these books, Cohen suggests general guidelines for levels of effect size.

These are .2 for small effect, .5 for medium effect, and .8 for large effect. However, even Cohen was concerned about proposing these as standards. He stated:

> The terms "small," "medium," and "large" are relative, not only to each other, but to the area of behavioral science or even more particularly to the specific content and research method being employed in any given investigation. In the face of this relativity, there is a certain risk inherent in offering conventional operational definitions for these terms for use in power analysis in as diverse a field of inquiry as behavioral science. This risk is nevertheless accepted in the belief that more is to be gained than lost by supplying a common conventional frame of reference which is recommended for use only when no better basis for estimating the ES index is available. (1988, p. 25)

Cohen's concerns were cited by Wolf (1986) and suggest that effect sizes should be interpreted in context. Specifically, one possibility is to compare a given effect size to the median effect size of studies extracted from the professional literature in that specific context rather than use some arbitrary guideline. Wolf indicates that a .5 standard deviation improvement is often considered practically significant and that the general guidelines of the National Institute of Education's Joint Dissemination Review Panel require .33 effect size, but at times will accept .25 to establish educational significance.

A broader debate on the use of statistical significance testing emerged from Cohen's power analysis books and other works. Kaufman (1998) indicates that the "controversy about the use or misuse of statistical significance testing has been evident in the literature for the past 10 years and has become the major methodological issue of our generation" (p. 1). The debate has spawned at least two special issues of journals (*Research in the Schools*, McLean & Kaufman, 1998; *Journal of Experimental Education*, Thompson, 1993) and dozens of other articles. The editorial policies of journals have been changed by the debate (e.g., APA, 1994; Schafer, 1990, 1991; Thompson, 1987, 1997).

The debate has ranged from those who recommend the elimination of statistical significance testing (e.g., Carver, 1978, 1993; Nix & Barnette, 1998) to those who staunchly support it (e.g., Frick, 1996; Levin, 1993, 1998; McLean & Ernest, 1998). However, even those who defend statistical significance testing indicate that significant results should be accompanied by a measure of practical significance. The leading method of reporting practical significance is through the provision of an effect size estimate (Kirk, 1996; McLean & Ernest, 1998; Robinson & Levin, 1997; Thompson, 1996). Unfortunately, the criteria for judging the practical significance of results based on effect size has defaulted to the use of Cohen's (1988) guidelines that even Cohen has warned us about (1988, 1990). As Wolf (1986) noted, empirical standards for judging effect size are needed.

At least two recent studies have attempted to estimate effect sizes that might occur by chance. The first of these (Barnette & McLean, 1999, November), found that when no differences exist, effect sizes range from 0.1152 with 2 groups and an n of 100 to 1.4044 with 10 groups and an n of 5, with a mean effect size of 0.4065. A second study by Barnette and McLean (2000, April) suggested that running statistical tests of hypothesis before computing effect sizes greatly reduced the number of spuriously high effect size values, with a mean effect size of 0.4065.

Research Questions

1. What is the probability of attaining standardized effect sizes up to 2.0 by chance as functions of number and size of samples?
2. What is the probability of attaining standardized effect sizes up to 2.0 that are also significant at .05 by chance as functions of number and size of sample?
3. How do these two probabilities compare?
4. Is it feasible to use the Protected Effect Size Probability to evaluate the size of an observed standardized effect size?

Methodology

Monte Carlo methods were used to generate the data for this research using random normal deviates as the basis for sample means to be compared using one-way ANOVA. Standardized effect sizes were generated for 100,000 replications within each combination of number of groups of: 2, 3, 4, 5, 6, 8 and 10 and sample sizes of: 5, 10, 15, 20, 25, 30, 40, 50, 60, 80, 100, 200, and 500, resulting in 9,100,000 total replications. The standardized effect size was computed as the range of means divided by the root mean square error. In addition, the probability of the observed F statistic was evaluated using alpha values of .25, .10, .05, .01, and .001 so each observed effect size could be identified as being statistically significant in addition to observed standardized effect size. Data were generated using a program written in double-precision Quick-BASIC. Table 1 presents the observed probabilities of the F statistics generated by the Monte Carlo Program. Analysis of the raw data was conducted using several routines of SAS®.

For each number of samples and sample size configuration, there were two statistics computed: the observed *F* statistic probability and the standardized effect size. The analysis results were: the observed proportion of standardized effect sizes achieving or exceeding the effect size values of 0 to 2.0 in steps of .1; and the observed proportion of standardized effect sizes achieving or exceeding the effect size values of 0 to 2.0 in steps of .1 and being significant at an alpha level of .05. The latter statistic is what is referred to as the Protected Effect Size. Data were obtained which permit evaluation of other alpha levels, but this paper presents only those for alpha of .05.

Results

There is parsimony in presenting the answers to research questions 1, 2, and 3 for each number of samples configuration. There are trends that are common across all configurations. As the magnitude of effect size increases, the probability of getting such a difference by chance decreases as would be expected. Within a given number of samples situation, as sample size increases, as expected, the probability of getting such a difference by chance decreases. Within a given sample size, as the number of groups increases, the probability of getting such a difference by chance increases. Another finding which is consistent across all configurations is that the significance test protected effect size probability is always equal to or less than the unprotected probability, in some cases dramatically so.

Tables relating to research question 1 (What is the probability of attaining standardized effect sizes up to 2.0 by chance as functions of number and size of samples?) are designated as Tables: 2, 4, 6, 8, 10, 12, and 14, and their corresponding Figures are: 1, 3, 5, 7, 9, 11, and 13. Tables relating to research question 2 (What is the probability of attaining standardized effect sizes up to 2.0 that are also significant at .05 by chance as functions of number and size of sample?) are: 3, 5, 7, 9, 11, 13, and 15 and their corresponding figures are: 2, 4, 6, 8, 10, 12, and 14. Each Table and Figure represents a number of samples configuration with sample size included within the presentation. Each number of samples configuration will be presented separately and research question 3 (How do these two probabilities compare?) will be discussed.

The Two-Sample (t Test) Situation

Table 2 and Figure 1 present the proportions of the observed effect sizes which meet or exceed the effect size measures from 0 to 2, in units of .1. The probability of getting a small effect size (.2) ranges from .7636 when n= 5 to .0021 when n= 500. It takes a sample size of about 200 to achieve less than a .05 probability. For a medium effect size (.5), the range of probabilities is from .4531 when n= 5 to .0000 when n= 500. It takes a sample size of greater than 30 to achieve less than .05 probability. For a large effect size (.8), the range of probabilities is .2419 when n= 5 to .0000 when n= 500. At a sample size of about 15 the probability drops below .05. Table 3 and Figure 2 present the proportions of the observed effect sizes that meet or exceed the effect size measures from 0 to 2, in units of .1, while also are significant at .05 based on the significance test. A comparison of the unprotected probabilities and protected probabilities indicates that in the two-sample situation, they are the same. This will not be the case as the number of samples increases.

The figures could be used to determine the probability of getting a given effect size by chance or getting one that also was significant at .05. For example, if an effect size was observed of .9 when samples of size 20 were used, the probability of getting this result would be about .0069, with the same probability had significance at .05 been required. Expansion of the tables and figures or, preferably, determination of equations to make this prediction, would be very useful in judging observed effect sizes.

The Three-Sample Situation

Table 4 and Figure 3 present the proportions of the observed effect sizes which meet or exceed the effect size measures from 0 to 2, in units of .1, in the three-sample situation. The probability of getting a small effect size (.2) ranges from .9461 when n= 5 to .0052 when n= 500. It takes a sample size considerably higher than 200 to achieve less than a .05 probability. For a medium effect size (.5), the range of probabilities is from .7138 when n= 5 to .0000 when n= 500. It takes a sample size of greater than 40 to achieve less than .05 probability. For a large effect size (.8), the range of probabilities is .4376 when n= 5 to .0000 when n= 500. At a sample size of between 15 and 20 the probability drops below .05.

Table 5 and Figure 4 present the proportions of the observed effect sizes that meet or exceed the effect size measures from 0 to 2, in units of .1, while also are significant at .05 based on the significance test. A comparison of the unprotected probabilities and protected probabilities indicates that in the three-sample situation, they are the same when samples are relatively large (50 or more): but at smaller sample sizes, the probability of the protected effect size is slightly lower than the unprotected effect size.

The figures could be used to determine the probability of getting a given effect size by chance or getting one that also was significant at .05. For example, if an effect size of .75 was observed when samples of size 25 were used, the probability of getting this result would be about .015 had significance at .05 been required, but .03 if the significance test was not required.

The Four-Sample Situation

Table 6 and Figure 5 present the proportions of the observed effect sizes which meet or exceed the effect size measures from 0 to 2, in units of .1, in the four-sample situation. The probability of getting a small effect size (.2) ranges from .9890 when n= 5 to .0090 when n= 500. It takes a sample size considerably higher than 200 to achieve less than a .05 probability. For a medium effect size (.5), the range of probabilities is from .8582 when n= 5 to .0000 when n= 500. It takes a sample size of greater than 50 to achieve less than .05 probability. For a large effect size (.8), the range of probabilities is .5985 when n= 5 to .0000 when n= 500. At a sample size of between 20 and 25 the probability drops below .05. Table 7 and Figure 6 present the proportions of the observed effect sizes that meet or exceed the effect size measures from 0 to 2, in units of .1, while also are significant at .05 based on the significance test. A comparison of the unprotected probabilities and protected probabilities indicates that in the four-sample situation, they are the same when samples are very large (100 or more) but at smaller sample sizes, the probability of the protected effect size was increasingly lower than the unprotected effect size as the effect size standard increased. For example, in the n= 5 situation an effect size of 1.7 had a probability that was not lower than .05 (.0702) but at the same difference magnitude the protected probability was .0480.

Using the figures to determine the probability of getting a given effect size by chance or getting one that also was significant at .05, if an effect size was observed of .65 when samples of size 30 were used, the probability of getting this result would be about .042 had significance at .05 been required, but it would not have been higher than .05 if the significance test was not required.

The Five, Six, and Eight Sample Situations

Review of Tables 8, 9, 10, 11, 12, and 13 and Figures 7, 8, 9, 10, 11, and 12 present results very similar to those found in the three and four-sample situations. The probabilities are slightly higher in all cells, but the comparative patterns are the same.

The Ten-Sample Situation

Table 14 and Figure 13 present the proportions of the observed effect sizes which meet or exceed the effect size measures from 0 to 2, in units of .1, in the ten-sample situation. The probability of getting a small effect size (.2) ranges from 1.0000 when n= 5 to .0531 when n= 500. It takes a sample size higher than 500 to achieve less than a .05 probability. For a medium effect size (.5), the range of probabilities is from .9984 when n= 5 to .0000 when n= 500. It takes a sample size of greater than 80 to achieve less than .05 probability. For a large effect size (.8), the range of probabilities is .9552 when n= 5 to .0000 when n= 500. At a sample size greater than 30 the probability drops below .05. Table 15 and Figure 14 present the proportions of the observed effect sizes that meet or exceed the effect size measures from 0 to 2, in units of .1, while also are significant at .05 based on the significance test. A comparison of the unprotected probabilities and protected probabilities indicates that in the ten-sample situation, they are much lower across all sample size configurations. For example, in the n= 40 situation an effect size of 0.6 had a probability that was not lower than .05 (.1835) but at the same difference magnitude the protected probability was .0478.

Conclusions

This paper clearly demonstrates that using effect size in research without a statistical test of hypothesis is a very risky undertaking. It is quite true that statistical tests of hypothesis provide only one type of information used for decision-making. However, interpreting effect size results by themselves can lead to just as poor, if not poorer, decisions than using only statistical tests of hypothesis. In general, we concur with McLean and Ernest (1998), who conclude that "statistical significance testing must be accompanied by judgments of the event's practical significance and replicability" (p. 21). However, we would add that a measure of practical significance such as effect size should be accompanied by a statistical test of hypothesis.

Is it feasible to use the Protected Effect Size Probability to evaluate the size of an observed standardized effect size? It is clear that the addition of the significance test reduces the probability of finding a seemingly large effect size by chance. Such a protected effect size indicator could be an answer to the arguments posed by both those who protest against the use of the significance test and those who propose its use in judging the magnitude of an observed effect.

Further Monte Carlo work which expands the data set and work on determining equations which could be used rather than the use of cumbersome tables could go a long way to make meaningful difference decision-making more useful and scientifically sound. Further research needs to include sampling from populations not meeting the normality and homogeneity assumptions, as well as the use of unequal sample sizes.

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Table 1. Observed *F* Statistics of Total Monte Carlo Runs

Expected Probability	Observed Probability
.25	.24907
.10	.09986
.05	.05011
.01	.01009
.001	.00098

Table 2. Proportion of Standardized Effect Sizes Exceeding Selected Values with no Significance Test, K= 2

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	.8802	.7636	.6502	.5454	.4531	.3712	.3012	.2419	.1931	.1538	.1210	.0946	.0744	.0583	.0456	.0354	.0276	.0222	.0176	.0138
10	.8260	.6592	.5119	.3821	.2772	.1944	.1335	.0899	.0598	.0378	.0239	.0153	.0097	.0059	.0036	.0021	.0013	.0007	.0004	.0003
15	.7870	.5887	.4178	.2816	.1812	.1113	.0653	.0368	.0201	.0102	.0054	.0025	.0012	.0005	.0003	.0002	.0001	.0000	.0000	.0000
20	.7528	.5303	.3483	.2122	.1219	.0654	.0329	.0155	.0069	.0031	.0012	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
25	.7258	.4815	.2925	.1623	.0829	.0381	.0170	.0066	.0026	.0009	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
30	.7021	.4421	.2500	.1264	.0571	.0234	.0085	.0028	.0008	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	.6525	.3727	.1811	.0771	.0282	.0091	.0027	.0006	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	.6162	.3189	.1372	.0503	.0146	.0037	.0007	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	.5845	.2736	.1021	.0302	.0071	.0013	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	.5281	.2081	.0606	.0120	.0018	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	.4794	.1591	.0357	.0052	.0005	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	.3167	.0462	.0027	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	.1149	.0021	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 3. Proportion of Standardized Effect Sizes Exceeding Selected Values and Significant at .05, the Protected Effect Size Probability, K= 2

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0456	.0354	.0276	.0222	.0176	.0138
10	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0378	.0239	.0153	.0097	.0059	.0036	.0021	.0013	.0007	.0004	.0003
15	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0368	.0201	.0102	.0054	.0025	.0012	.0005	.0003	.0002	.0001	.0000	.0000	.0000
20	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0155	.0069	.0031	.0012	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
25	≥.05	≥.05	≥.05	≥.05	≥.05	.0381	.0170	.0066	.0026	.0009	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
30	≥.05	≥.05	≥.05	≥.05	≥.05	.0234	.0085	.0028	.0008	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	≥.05	≥.05	≥.05	≥.05	.0282	.0091	.0027	.0006	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	≥.05	≥.05	≥.05	≥.05	.0146	.0037	.0007	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	≥.05	≥.05	≥.05	.0302	.0071	.0013	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	≥.05	≥.05	≥.05	.0120	.0018	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	≥.05	≥.05	.0357	.0052	.0005	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	≥.05	.0462	.0027	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	≥.05	.0021	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 4. Proportion of Standardized Effect Sizes Exceeding Selected Values with no Significance Test, K= 3

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	.9860	.9461	.8830	.8034	.7138	.6189	.5247	.4376	.3586	.2881	.2291	.1790	.1393	.1078	.0826	.0631	.0478	.0365	.0272	.0203
10	.9725	.8950	.7812	.6490	.5114	.3870	.2792	.1941	.1302	.0843	.0536	.0328	.0200	.0115	.0066	.0040	.0021	.0012	.0007	.0005
15	.9581	.8478	.6935	.5219	.3643	.2375	.1450	.0828	.0448	.0233	.0111	.0052	.0023	.0010	.0004	.0002	.0001	.0001	.0000	.0000
20	.9456	.8007	.6096	.4176	.2593	.1464	.0752	.0362	.0165	.0071	.0028	.0011	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000
25	.9332	.7600	.5405	.3359	.1858	.0919	.0412	.0171	.0061	.0021	.0006	.0001	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
30	.9211	.7184	.4789	.2739	.1332	.0571	.0224	.0077	.0024	.0007	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	.8944	.6438	.3738	.1768	.0686	.0222	.0059	.0014	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	.8689	.5760	.2931	.1150	.0361	.0086	.0018	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	.8460	.5158	.2303	.0751	.0193	.0036	.0006	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	.8023	.4159	.1422	.0329	.0057	.0007	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	.7589	.3342	.0878	.0134	.0014	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	.5765	.1120	.0085	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	.2508	.0052	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 5. Proportion of Standardized Effect Sizes Exceeding Selected Values and Significant at .05, the Protected Effect Size Probability, K= 3

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0446	.0365	.0272	.0203
10	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0475	.0328	.0200	.0115	.0066	.0040	.0021	.0012	.0007	.0005
15	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0423	.0233	.0111	.0052	.0023	.0010	.0004	.0002	.0001	.0001	.0000	.0000
20	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0480	.0362	.0165	.0071	.0028	.0011	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000
25	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0407	.0171	.0061	.0021	.0006	.0001	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
30	≥.05	≥.05	≥.05	≥.05	≥.05	.0471	.0224	.0077	.0024	.0007	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	≥.05	≥.05	≥.05	≥.05	.0484	.0222	.0059	.0014	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	≥.05	≥.05	≥.05	≥.05	.0361	.0086	.0018	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	≥.05	≥.05	≥.05	≥.05	.0193	.0036	.0006	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	≥.05	≥.05	≥.05	.0329	.0057	.0007	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	≥.05	≥.05	≥.05	.0134	.0014	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	≥.05	≥.05	.0085	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	≥.05	.0052	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 6. Proportion of Standardized Effect Sizes Exceeding Selected Values with no Significance Test, K= 4

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	.9986	.9890	.9638	.9195	.8582	.7802	.6925	.5985	.5041	.4158	.3373	.2677	.2105	.1619	.1233	.0930	.0702	.0513	.0375	.0276
10	.9959	.9695	.9077	.8073	.6790	.5412	.4096	.2949	.1997	.1312	.0827	.0506	.0298	.0166	.0094	.0052	.0027	.0013	.0006	.0004
15	.9923	.9461	.8422	.6913	.5226	.3619	.2307	.1382	.0759	.0407	.0203	.0094	.0041	.0015	.0007	.0003	.0001	.0000	.0000	.0000
20	.9889	.9209	.7773	.5864	.3964	.2393	.1300	.0636	.0286	.0117	.0044	.0014	.0005	.0002	.0000	.0000	.0000	.0000	.0000	.0000
25	.9841	.8933	.7123	.4906	.2937	.1530	.0688	.0290	.0107	.0032	.0011	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
30	.9801	.8657	.6514	.4122	.2195	.0987	.0381	.0124	.0036	.0011	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	.9682	.8058	.5359	.2817	.1176	.0395	.0106	.0023	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	.9584	.7471	.4400	.1910	.0625	.0162	.0033	.0006	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	.9465	.6924	.3553	.1273	.0332	.0065	.0010	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	.9219	.5837	.2305	.0575	.0090	.0011	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	.8922	.4904	.1464	.0259	.0030	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	.7491	.1867	.0158	.0006	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	.3873	.0090	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 7. Proportion of Standardized Effect Sizes Exceeding Selected Values and Significant at .05, the Protected Effect Size Probability, K= 4

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0480	.0438	.0363	.0276
10	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0483	.0426	.0296	.0166	.0094	.0052	.0027	.0013	.0006	.0004
15	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0481	.0379	.0203	.0094	.0041	.0015	.0007	.0003	.0001	.0000	.0000	.0000
20	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0463	.0285	.0117	.0044	.0014	.0005	.0002	.0000	.0000	.0000	.0000	.0000	.0000
25	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0466	.0289	.0107	.0032	.0011	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
30	≥.05	≥.05	≥.05	≥.05	≥.05	.0494	.0359	.0124	.0036	.0011	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	≥.05	≥.05	≥.05	≥.05	.0490	.0368	.0106	.0023	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	≥.05	≥.05	≥.05	≥.05	.0451	.0162	.0033	.0006	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	≥.05	≥.05	≥.05	.0496	.0324	.0065	.0010	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	≥.05	≥.05	≥.05	.0440	.0090	.0011	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	≥.05	≥.05	≥.05	.0259	.0030	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	≥.05	≥.05	.0158	.0006	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	≥.05	.0090	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 8. Proportion of Standardized Effect Sizes Exceeding Selected Values with no Significance Test, K= 5

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	.9999	.9978	.9887	.9673	.9300	.8755	.8020	.7171	.6211	.5258	.4349	.3510	.2765	.2141	.1630	.1226	.0908	.0664	.0486	.0350
10	.9994	.9915	.9627	.8983	.7958	.6658	.5246	.3922	.2761	.1846	.1200	.0733	.0433	.0246	.0134	.0073	.0041	.0021	.0009	.0005
15	.9987	.9813	.9215	.8061	.6458	.4726	.3158	.1926	.1089	.0577	.0285	.0129	.0052	.0020	.0007	.0002	.0001	.0000	.0000	.0000
20	.9978	.9692	.8760	.7112	.5125	.3257	.1836	.0919	.0420	.0176	.0070	.0026	.0009	.0003	.0001	.0000	.0000	.0000	.0000	.0000
25	.9969	.9552	.8243	.6194	.3965	.2190	.1035	.0419	.0148	.0049	.0015	.0005	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
30	.9957	.9357	.7702	.5319	.3030	.1441	.0569	.0190	.0056	.0015	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	.9916	.8963	.6638	.3804	.1690	.0587	.0170	.0040	.0007	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	.9872	.8548	.5621	.2674	.0930	.0252	.0053	.0008	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	.9821	.8061	.4710	.1869	.0516	.0100	.0016	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	.9683	.7132	.3211	.0868	.0142	.0015	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	.9548	.6193	.2115	.0391	.0042	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	.8543	.2632	.0247	.0009	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	.5088	.0144	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 9. Proportion of Standardized Effect Sizes Exceeding Selected Values and Significant at .05, the Protected Effect Size Probability, K= 5

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0497	.0485	.0458	.0410	.0331
10	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0497	.0462	.0373	.0245	.0134	.0073	.0041	.0021	.0009	.0005
15	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0484	.0420	.0276	.0129	.0052	.0020	.0007	.0002	.0001	.0000	.0000	.0000
20	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0489	.0466	.0361	.0176	.0070	.0026	.0009	.0003	.0001	.0000	.0000	.0000	.0000	.0000
25	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0471	.0353	.0148	.0049	.0015	.0005	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
30	≥.05	≥.05	≥.05	≥.05	≥.05	.0492	.0415	.0190	.0056	.0015	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	≥.05	≥.05	≥.05	≥.05	.0490	.0418	.0170	.0040	.0007	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	≥.05	≥.05	≥.05	≥.05	.0475	.0248	.0053	.0008	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	≥.05	≥.05	≥.05	≥.05	.0406	.0100	.0016	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	≥.05	≥.05	≥.05	.0471	.0142	.0015	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	≥.05	≥.05	≥.05	.0343	.0042	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	≥.05	≥.05	.0245	.0009	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	≥.05	.0144	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 10. Proportion of Standardized Effect Sizes Exceeding Selected Values with no Significance Test, K= 6

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	1.000	.9995	.9967	.9877	.9667	.9284	.8735	.8006	.7130	.6175	.5204	.4269	.3423	.2679	.2049	.1540	.1151	.0836	.0595	.0427
10	.9999	.9977	.9842	.9468	.8732	.7630	.6275	.4853	.3531	.2419	.1575	.0970	.0560	.0316	.0172	.0089	.0045	.0022	.0011	.0006
15	.9998	.9942	.9623	.8818	.7464	.5753	.3996	.2531	.1457	.0779	.0379	.0174	.0075	.0032	.0012	.0004	.0001	.0001	.0000	.0000
20	.9996	.9881	.9327	.8036	.6122	.4086	.2392	.1227	.0567	.0239	.0092	.0031	.0010	.0003	.0001	.0000	.0000	.0000	.0000	.0000
25	.9993	.9811	.8951	.7177	.4887	.2808	.1370	.0584	.0214	.0067	.0022	.0007	.0002	.0001	.0000	.0000	.0000	.0000	.0000	.0000
30	.9989	.9716	.8533	.6316	.3833	.1903	.0784	.0277	.0080	.0020	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	.9978	.9461	.7603	.4723	.2224	.0814	.0237	.0059	.0011	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	.9962	.9175	.6650	.3444	.1275	.0344	.0069	.0010	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	.9939	.8821	.5698	.2440	.0695	.0140	.0023	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	.9881	.8019	.4036	.1178	.0209	.0021	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	.9814	.7184	.2757	.0542	.0061	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	.9169	.3363	.0347	.0011	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	.6091	.0210	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 11. Proportion of Standardized Effect Sizes Exceeding Selected Values and Significant at .05, the Protected Probability, K= 6

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0494	.0485	.0460	.0417	.0360
10	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0472	.0402	.0288	.0171	.0089	.0045	.0022	.0011	.0006
15	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0443	.0321	.0173	.0075	.0032	.0012	.0004	.0001	.0001	.0000	.0000
20	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0483	.0400	.0228	.0092	.0031	.0010	.0003	.0001	.0000	.0000	.0000	.0000	.0000
25	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0495	.0404	.0208	.0067	.0022	.0007	.0002	.0001	.0000	.0000	.0000	.0000	.0000	.0000
30	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0442	.0256	.0080	.0020	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	≥.05	≥.05	≥.05	≥.05	≥.05	.0445	.0226	.0059	.0011	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	≥.05	≥.05	≥.05	≥.05	.0489	.0299	.0069	.0010	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	≥.05	≥.05	≥.05	≥.05	.0424	.0140	.0023	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	≥.05	≥.05	≥.05	.0486	.0204	.0021	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	≥.05	≥.05	≥.05	.0389	.0061	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	≥.05	≥.05	.0304	.0011	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	≥.05	.0205	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 12. Proportion of Standardized Effect Sizes Exceeding Selected Values with no Significance Test, K= 8

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	1.000	1.000	.9997	.9982	.9928	.9781	.9499	.9048	.8398	.7578	.6624	.5623	.4631	.3709	.2884	.2180	.1624	.1193	.0851	.0598
10	1.000	.9998	.9972	.9849	.9510	.8807	.7707	.6316	.4837	.3480	.2334	.1468	.0869	.0497	.0262	.0129	.0067	.0032	.0017	.0007
15	1.000	.9993	.9911	.9563	.8673	.7212	.5423	.3636	.2229	.1224	.0614	.0282	.0124	.0048	.0017	.0007	.0002	.0001	.0000	.0000
20	1.000	.9983	.9799	.9073	.7589	.5548	.3507	.1906	.0916	.0380	.0146	.0050	.0016	.0005	.0001	.0000	.0000	.0000	.0000	.0000
25	1.000	.9968	.9646	.8513	.6427	.4067	.2119	.0925	.0348	.0111	.0035	.0009	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000
30	1.000	.9939	.9414	.7784	.5292	.2859	.1240	.0444	.0137	.0034	.0008	.0002	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	.9999	.9855	.8812	.6252	.3324	.1310	.0400	.0093	.0018	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	.9997	.9738	.8060	.4827	.1977	.0574	.0124	.0020	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	.9995	.9573	.7216	.3596	.1138	.0242	.0038	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	.9985	.9128	.5518	.1839	.0350	.0037	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	.9967	.8509	.4001	.0912	.0108	.0008	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	.9748	.4780	.0573	.0017	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	.7617	.0357	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 13. Proportion of Standardized Effect Sizes Exceeding Selected Values and Significant at .05, the Protected Probability, K= 8

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0481	.0446	.0395
10	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0484	.0436	.0348	.0231	.0127	.0067	.0032	.0017	.0007
15	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0491	.0461	.0373	.0238	.0121	.0048	.0017	.0007	.0002	.0001	.0000	.0000
20	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0492	.0436	.0291	.0141	.0050	.0016	.0005	.0001	.0000	.0000	.0000	.0000	.0000
25	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0491	.0436	.0278	.0109	.0035	.0009	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000
30	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0469	.0321	.0134	.0034	.0008	.0002	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	≥.05	≥.05	≥.05	≥.05	≥.05	.0471	.0300	.0092	.0018	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	≥.05	≥.05	≥.05	≥.05	.0495	.0361	.0121	.0020	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	≥.05	≥.05	≥.05	≥.05	.0453	.0214	.0038	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	≥.05	≥.05	≥.05	≥.05	.0279	.0037	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	≥.05	≥.05	≥.05	.0439	.0107	.0008	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	≥.05	≥.05	.0374	.0017	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	≥.05	.0278	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 14. Proportion of Standardized Effect Sizes Exceeding Selected Values with no Significance Test, K= 10

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	1.000	1.000	1.000	.9997	.9984	.9934	.9808	.9552	.9133	.8499	.7672	.6719	.5680	.4654	.3701	.2855	.2154	.1572	.1116	.0786
10	1.000	1.000	.9997	.9960	.9812	.9402	.8589	.7386	.5912	.4400	.3047	.1962	.1193	.0683	.0367	.0186	.0092	.0044	.0020	.0011
15	1.000	.9999	.9981	.9842	.9338	.8238	.6571	.4683	.2969	.1700	.0871	.0404	.0167	.0066	.0024	.0008	.0003	.0001	.0000	.0000
20	1.000	.9998	.9941	.9591	.8540	.6691	.4512	.2585	.1293	.0557	.0214	.0072	.0023	.0007	.0002	.0000	.0000	.0000	.0000	.0000
25	1.000	.9994	.9872	.9202	.7521	.5132	.2852	.1319	.0512	.0170	.0046	.0012	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000
30	1.000	.9988	.9771	.8702	.6434	.3754	.1737	.0646	.0198	.0051	.0010	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	1.000	.9963	.9424	.7416	.4345	.1835	.0566	.0130	.0024	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	1.000	.9916	.8911	.5985	.2696	.0834	.0178	.0028	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	.9999	.9850	.8270	.4646	.1602	.0359	.0052	.0006	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	.9997	.9596	.6718	.2550	.0515	.0006	.0004	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	.9995	.9226	.5105	.1292	.0160	.0009	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	.9925	.5961	.0831	.0028	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	.8535	.0531	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Table 15. Proportion of Standardized Effect Sizes Exceeding Selected Values and Significant at .05, the Protected Probability, K= 10

n	Standardized Effect Size d																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
5	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0495	.0484	.0457	.0412
10	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0493	.0457	.0380	.0275	.0167	.0089	.0044	.0020	.0011
15	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0483	.0409	.0280	.0150	.0065	.0024	.0008	.0003	.0001	.0000	.0000
20	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0459	.0339	.0182	.0070	.0023	.0007	.0002	.0000	.0000	.0000	.0000	.0000
25	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0488	.0451	.0316	.0151	.0045	.0012	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000
30	≥.05	≥.05	≥.05	≥.05	≥.05	≥.05	.0485	.0361	.0172	.0051	.0010	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
40	≥.05	≥.05	≥.05	≥.05	≥.05	.0478	.0327	.0119	.0024	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
50	≥.05	≥.05	≥.05	≥.05	≥.05	.0405	.0157	.0028	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
60	≥.05	≥.05	≥.05	≥.05	.0470	.0265	.0052	.0006	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
80	≥.05	≥.05	≥.05	≥.05	.0323	.0056	.0004	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
100	≥.05	≥.05	≥.05	.0475	.0146	.0009	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
200	≥.05	≥.05	.0394	.0028	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
500	≥.05	.0317	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

Figure 1. Probability of Effect Size by Chance, K= 2

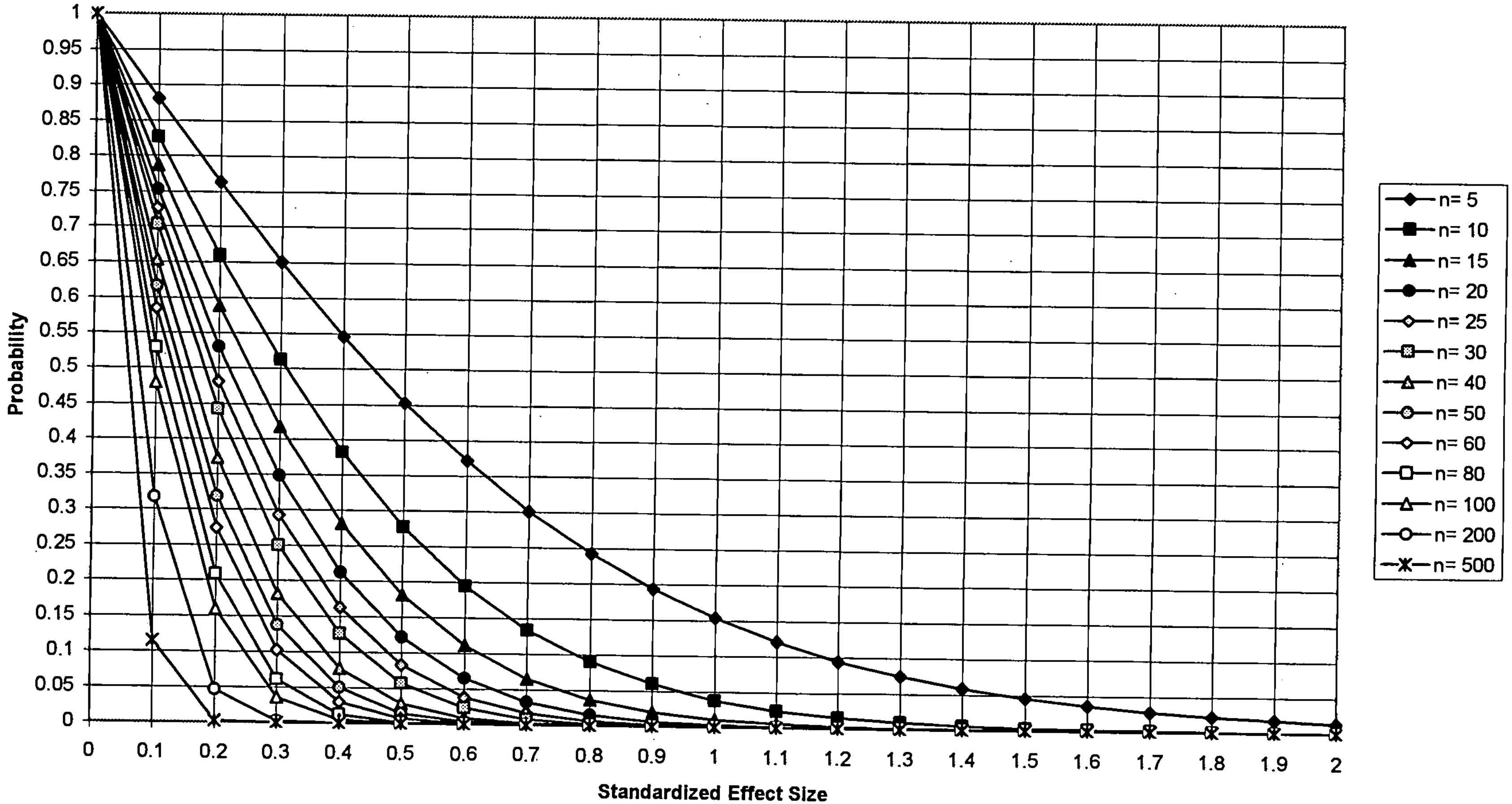

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Figure 2. Protected Probability, Alpha= .05, K= 2

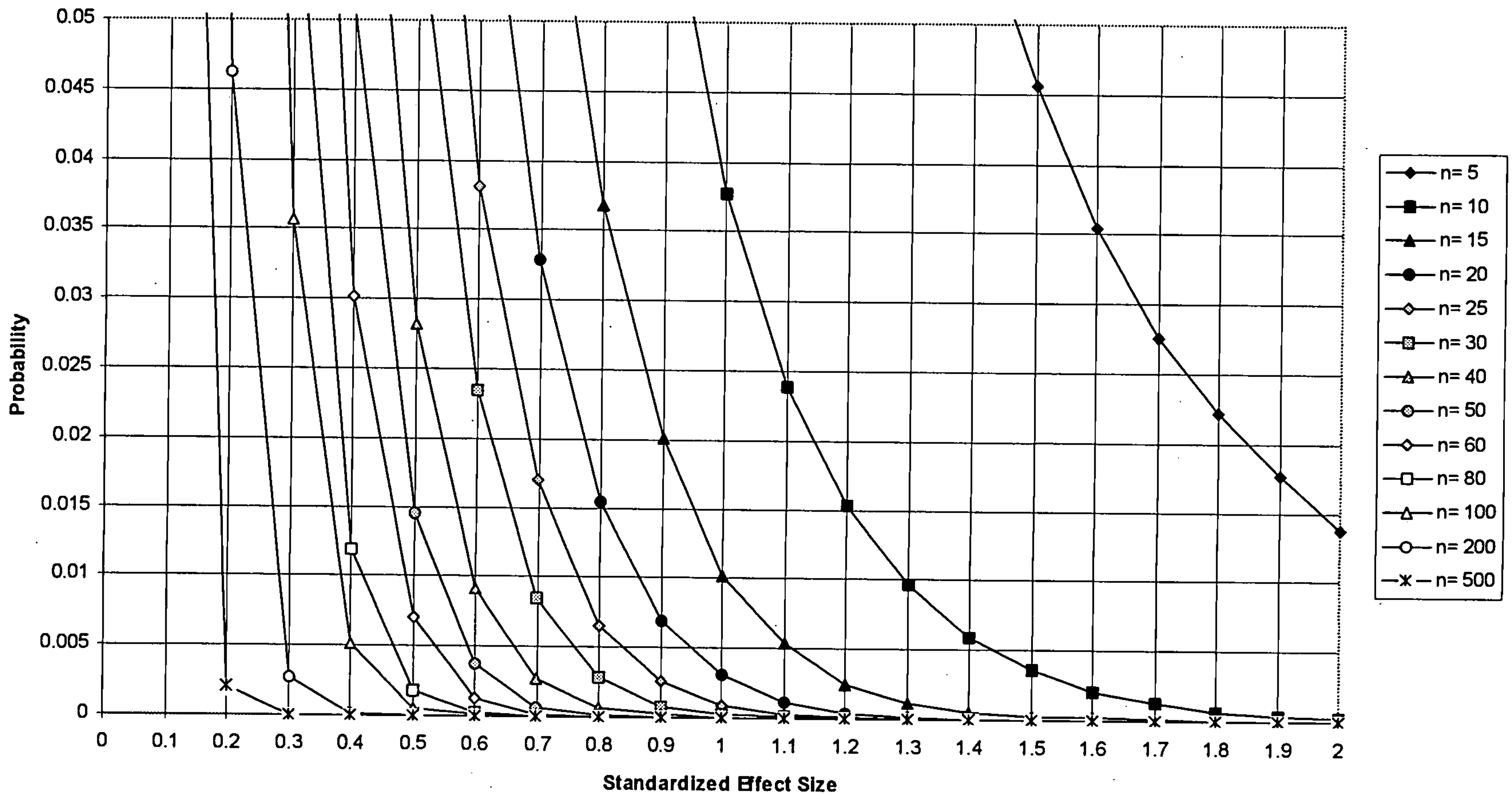

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Figure 3. Probability of Effect Size by Chance, K= 3

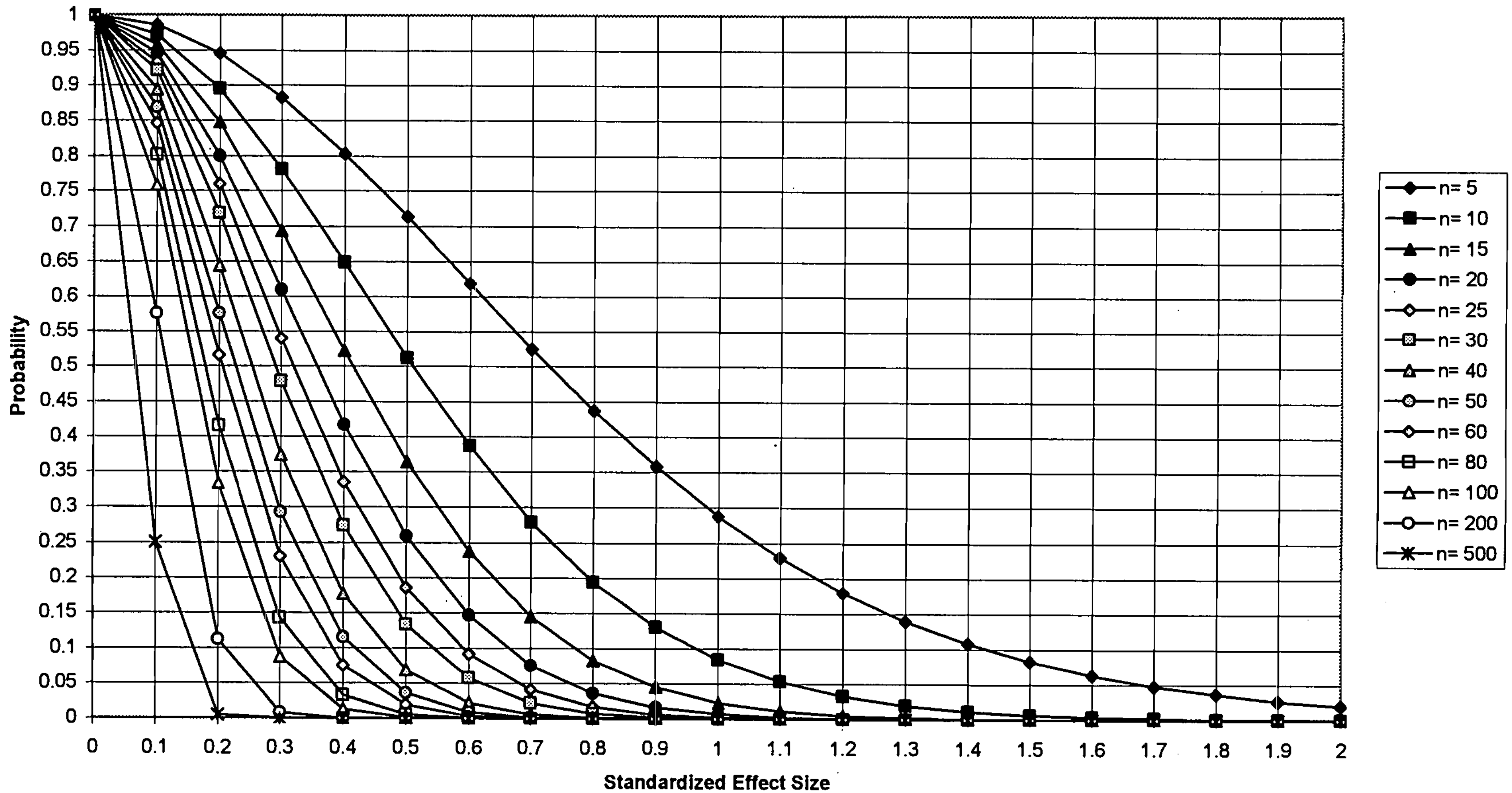

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Figure 4. Protected Probability, Alpha= .05, K= 3

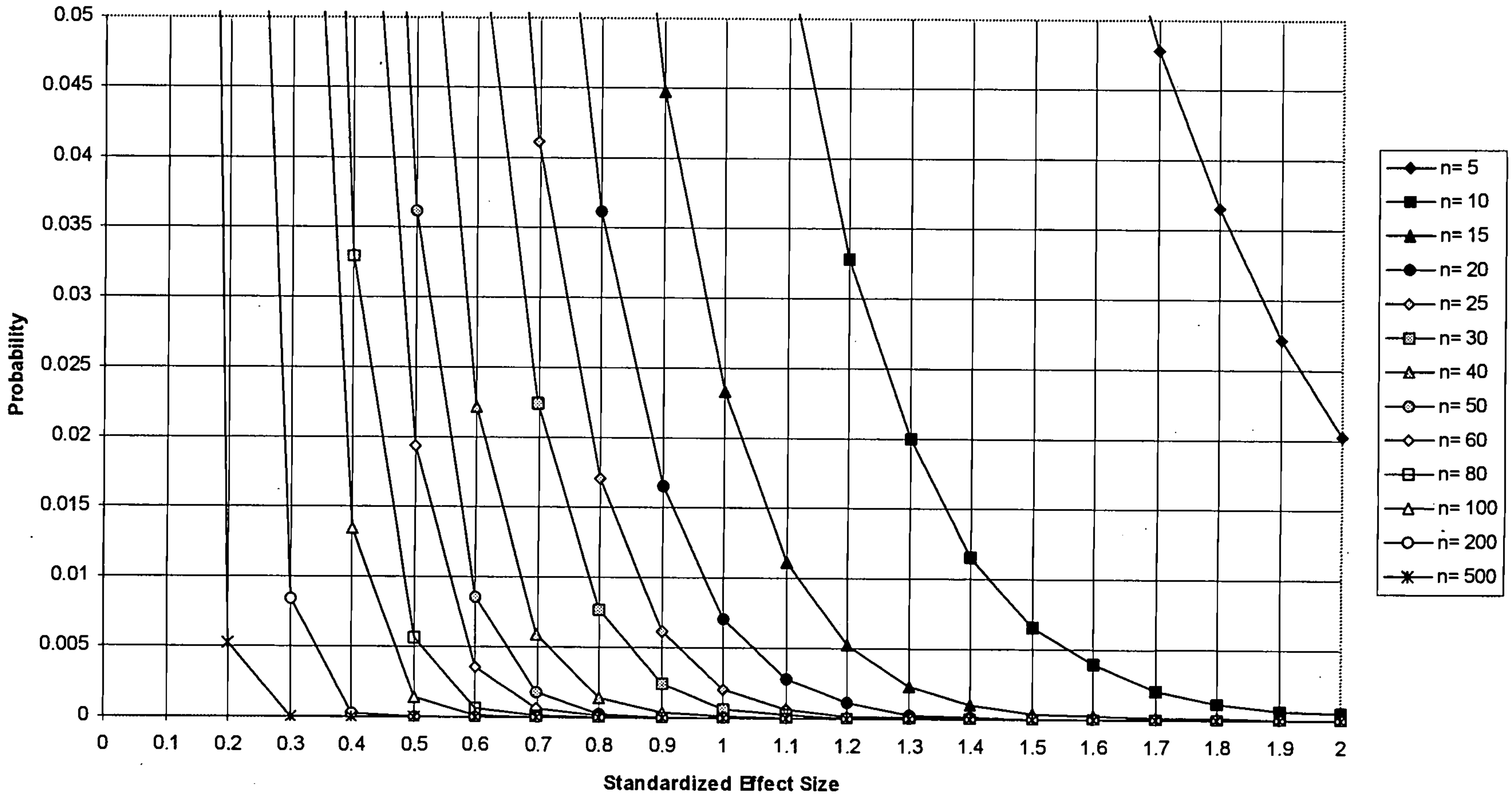

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Figure 5. Probability of Effect Size by Chance, K= 4

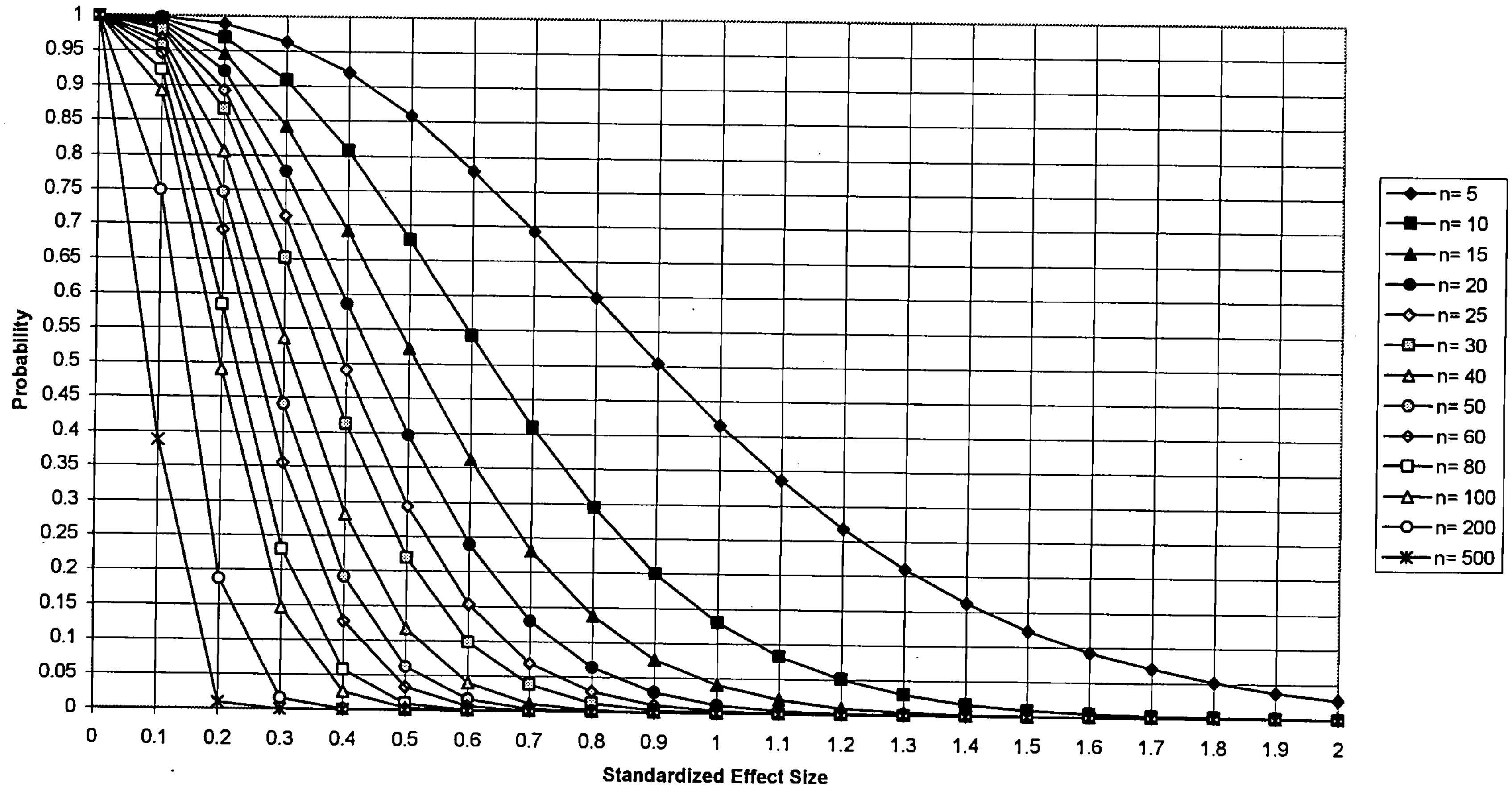

Figure 6. Protected Probability, Alpha= .05, K= 4

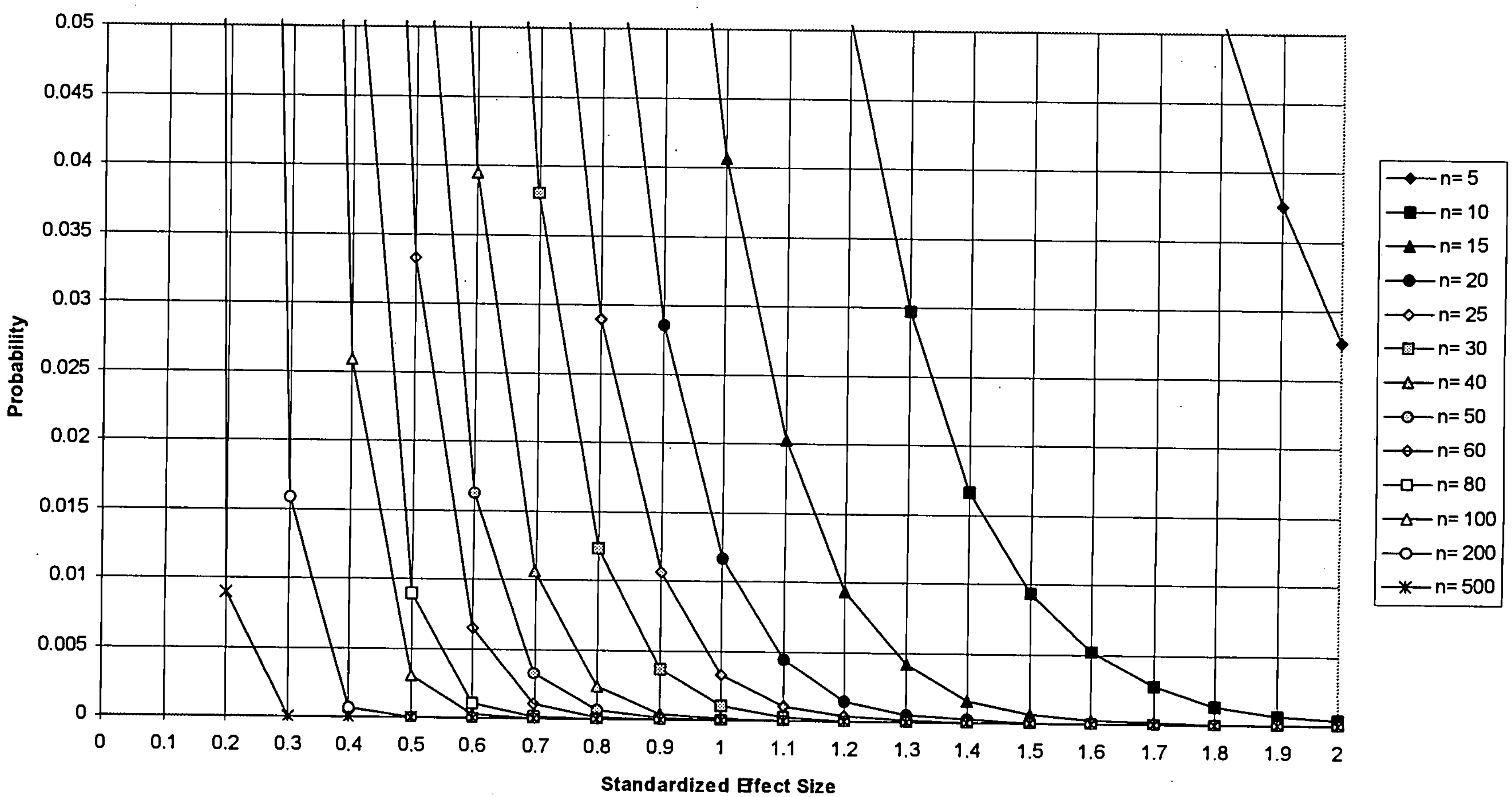

Figure 7. Probability of Effect Size by Chance, K= 5

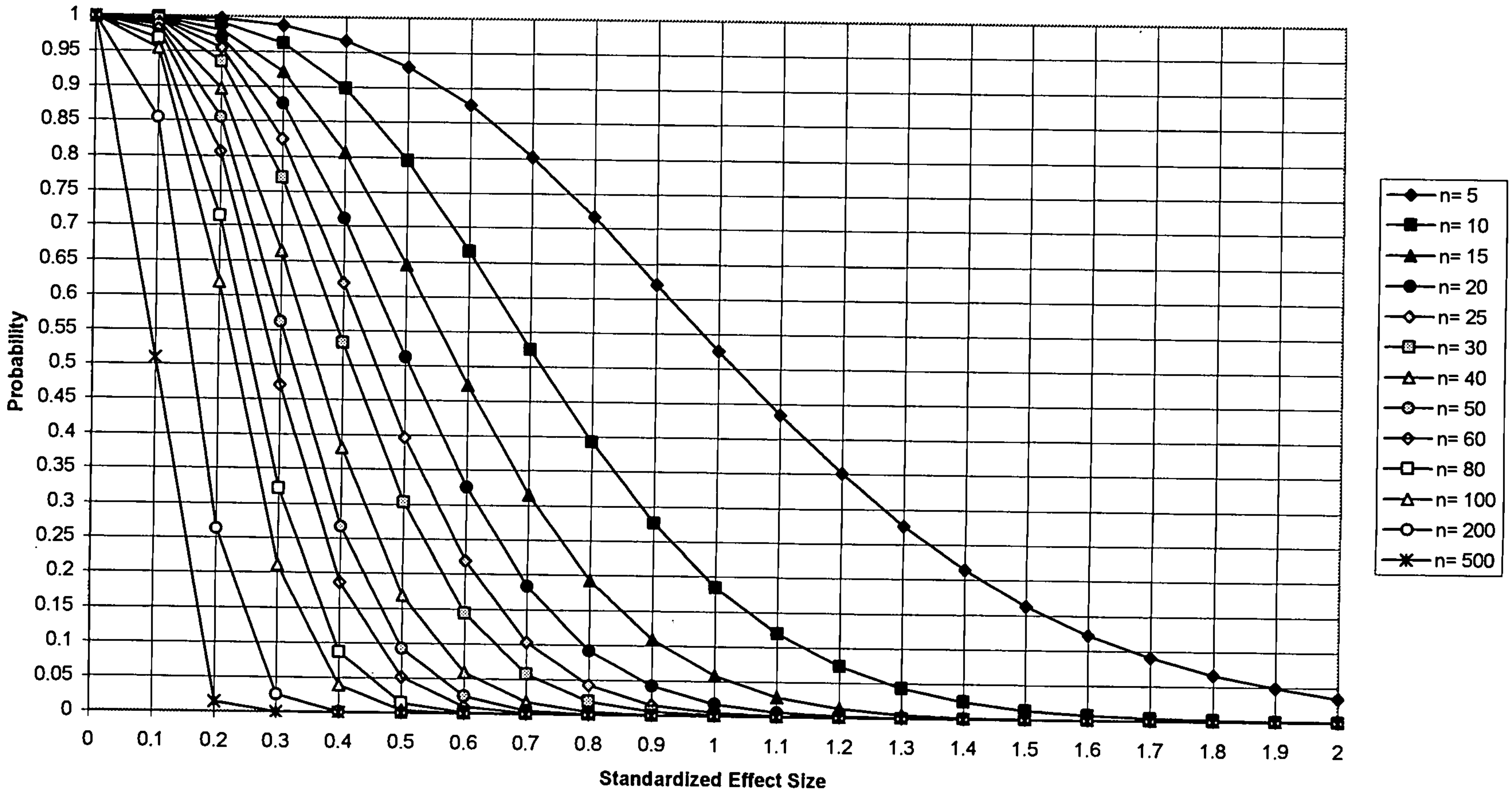

Figure 8. Protected Probability, Alpha= .05, K= 5

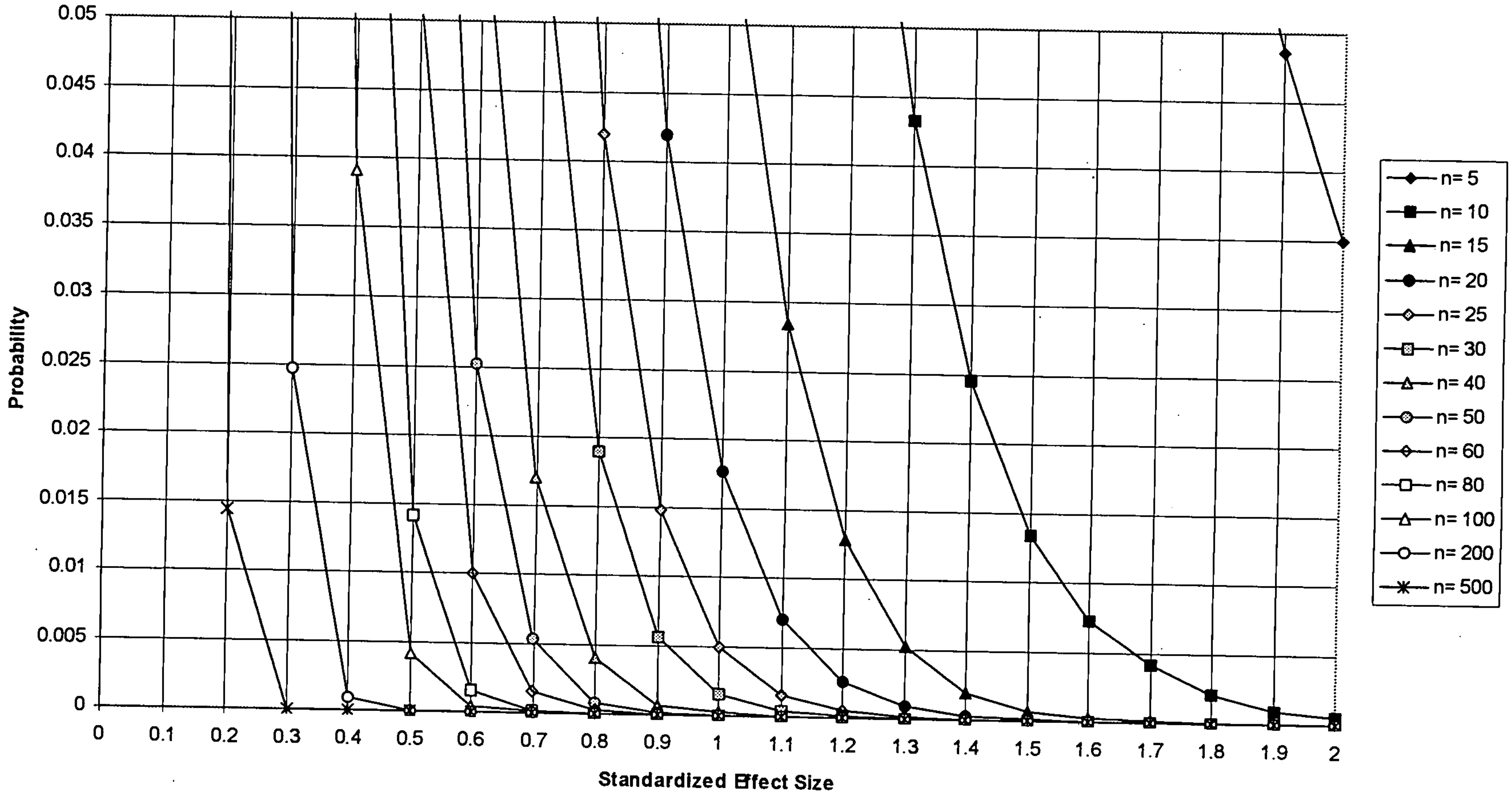

Figure 9. Probability of Effect Size by Chance, K= 6

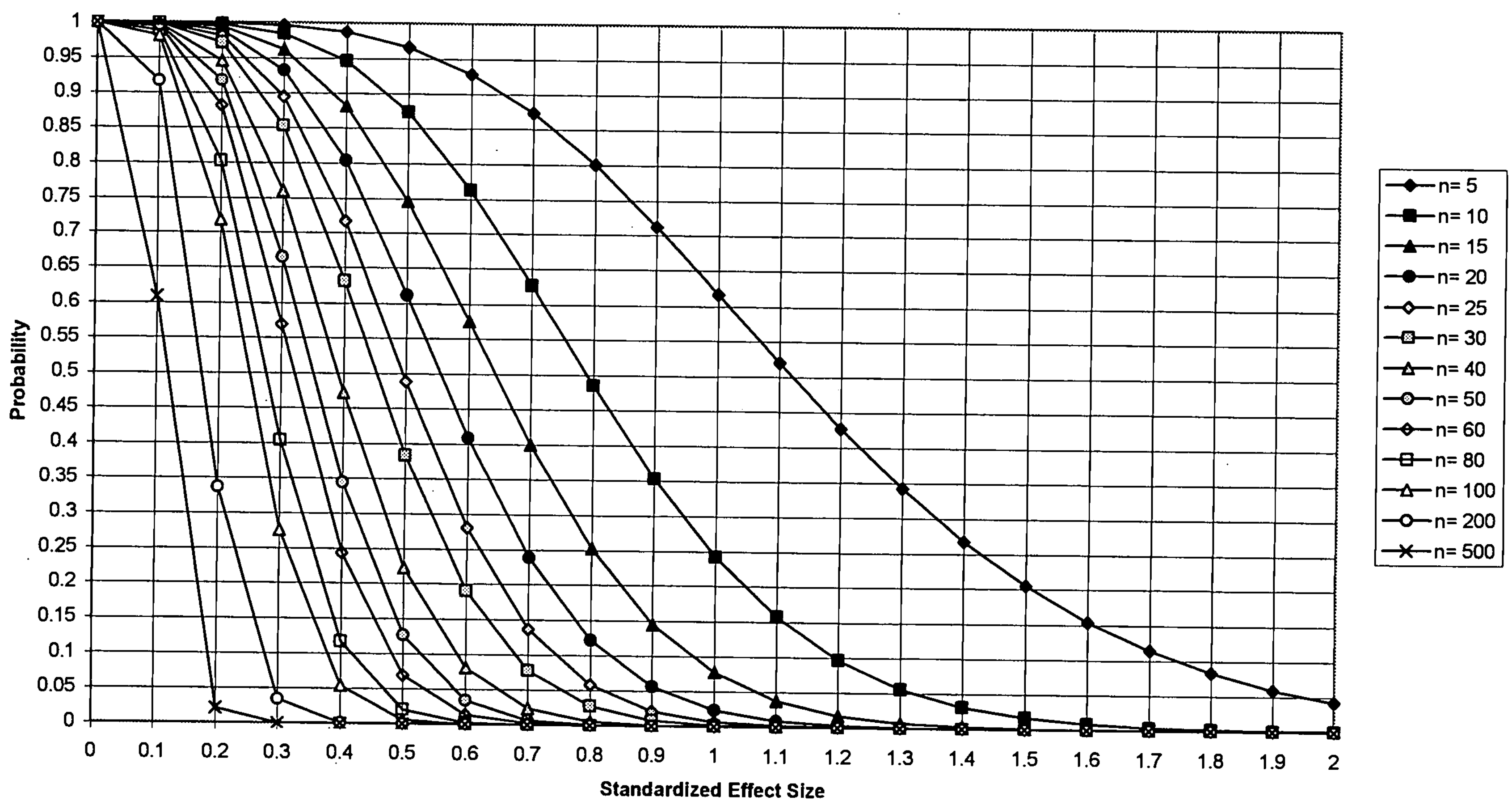

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Figure 10. Protected Probability, Alpha= .05, K= 6

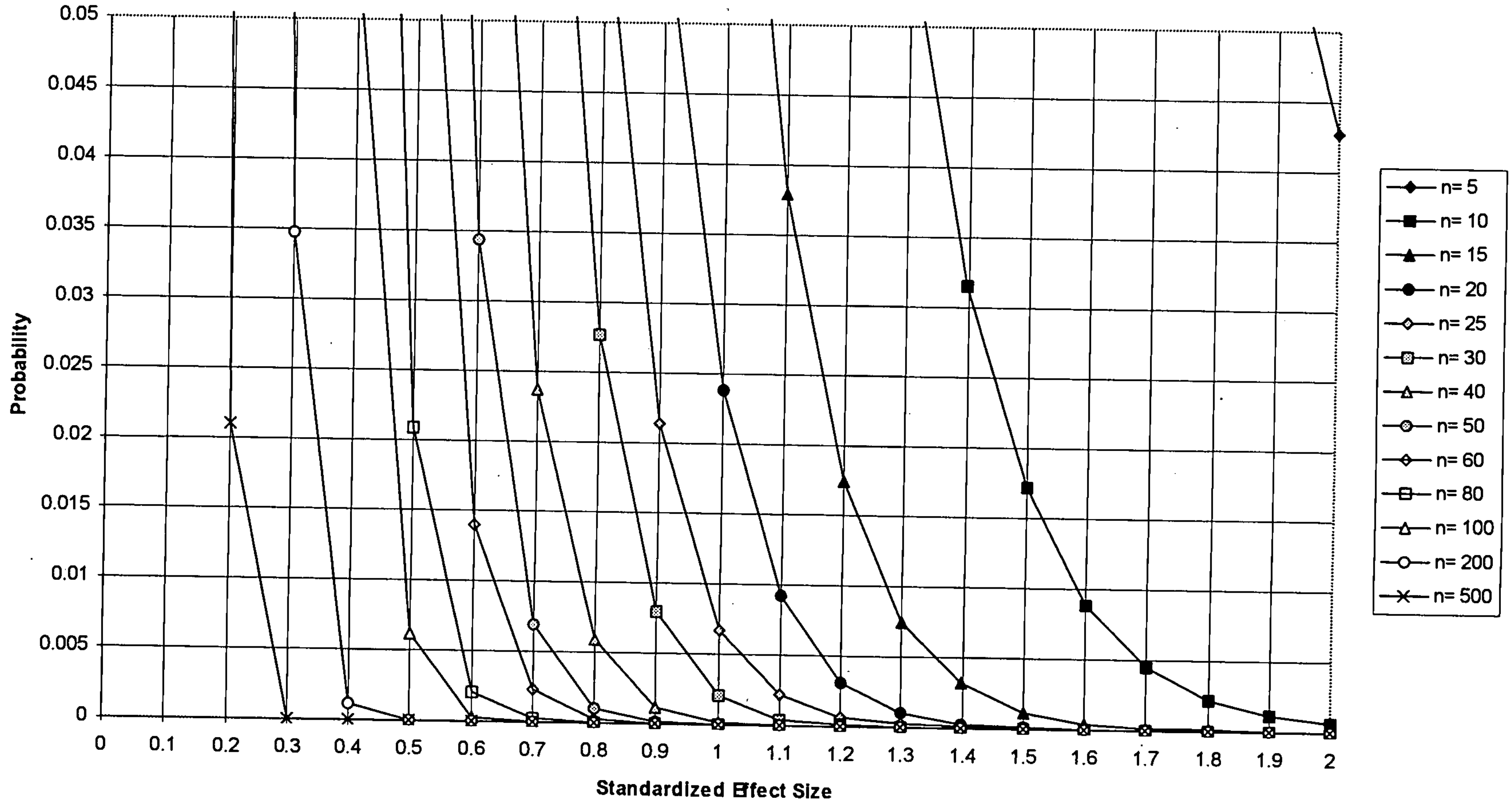

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Figure 11. Probability of Effect Size by Chance, K= 8

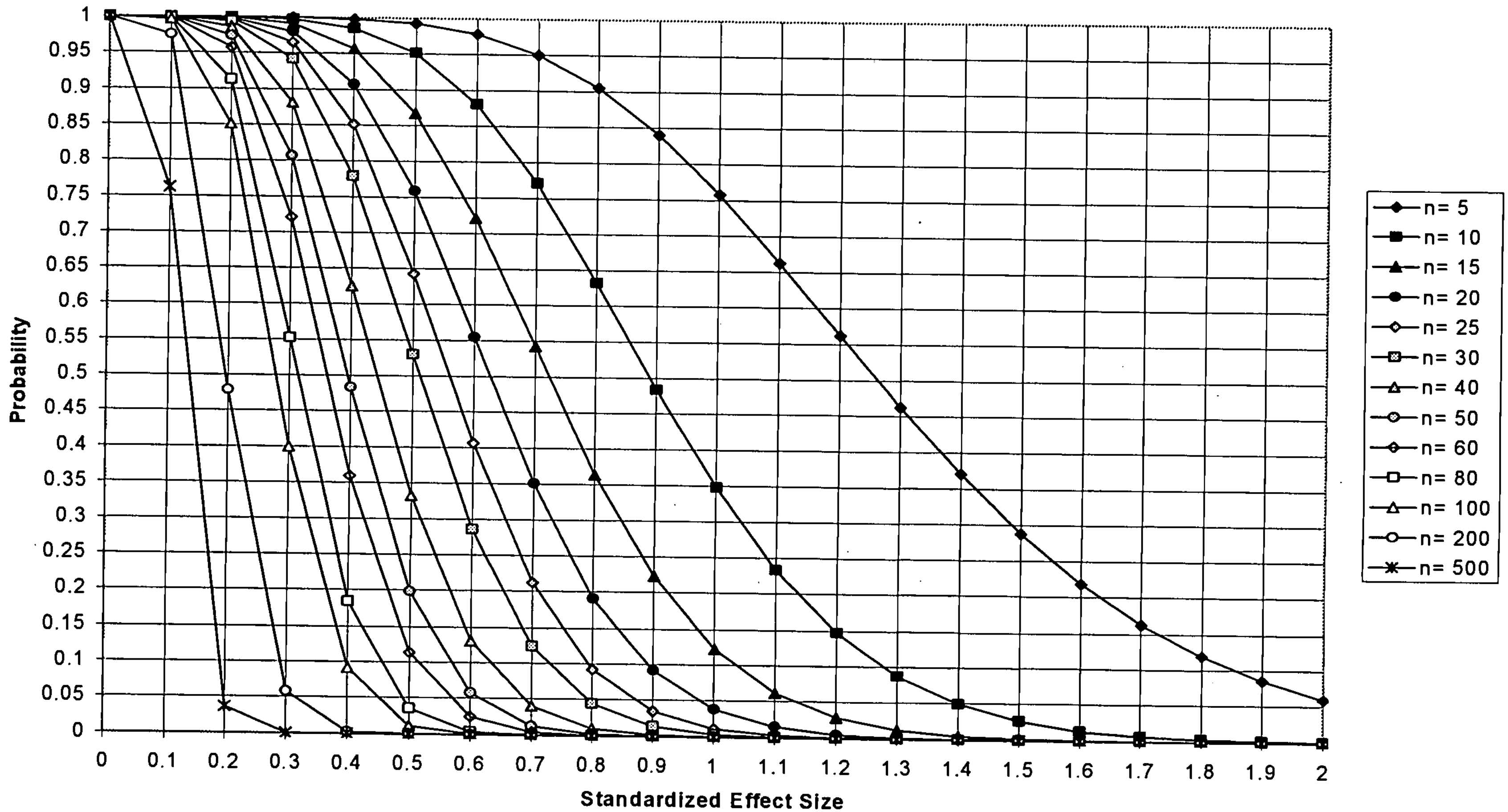

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Figure 12. Protected Probability, Alpha= .05, K= 8

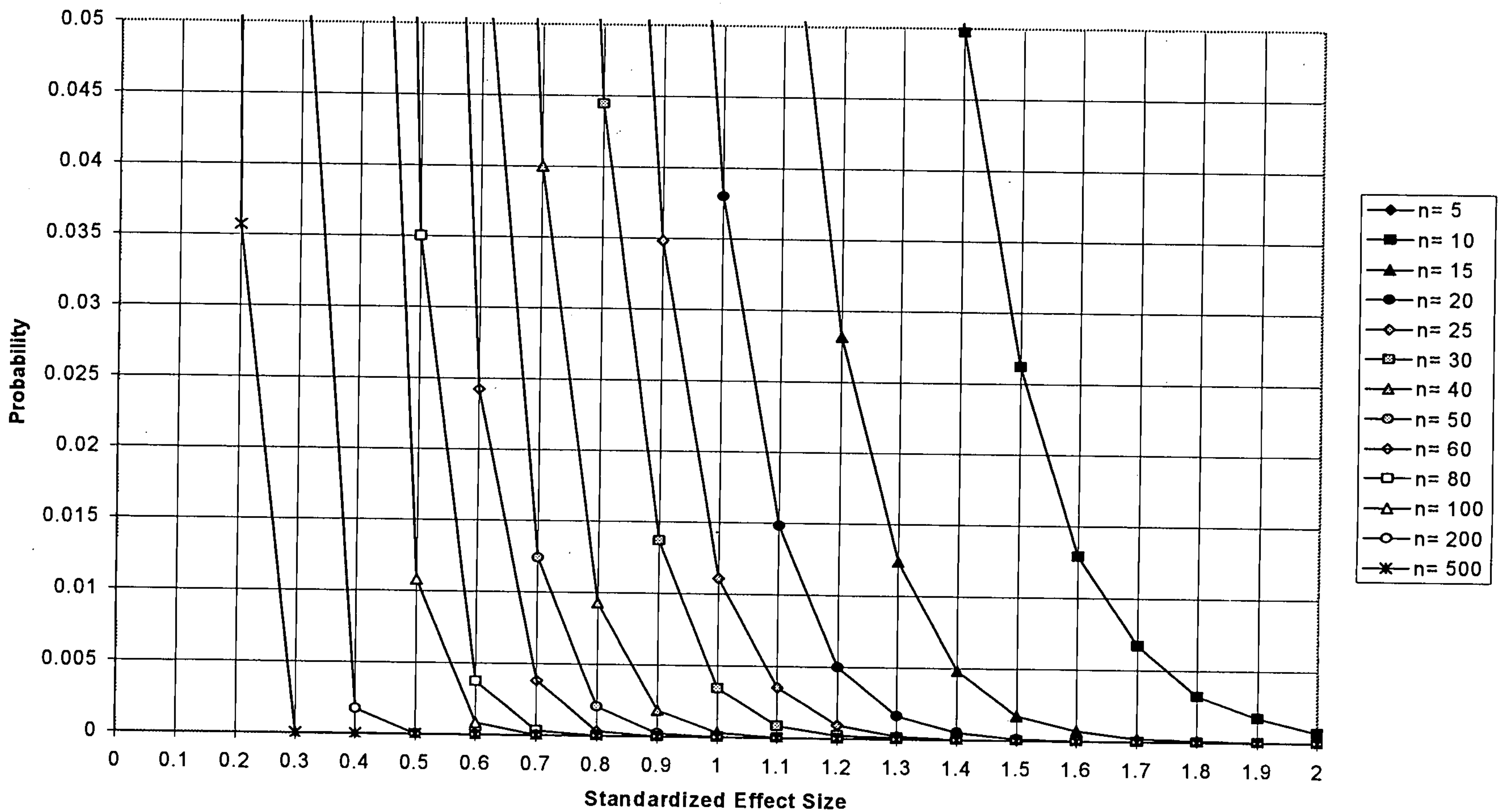

Figure 13. Probability of Effect Size by Chance, K= 10

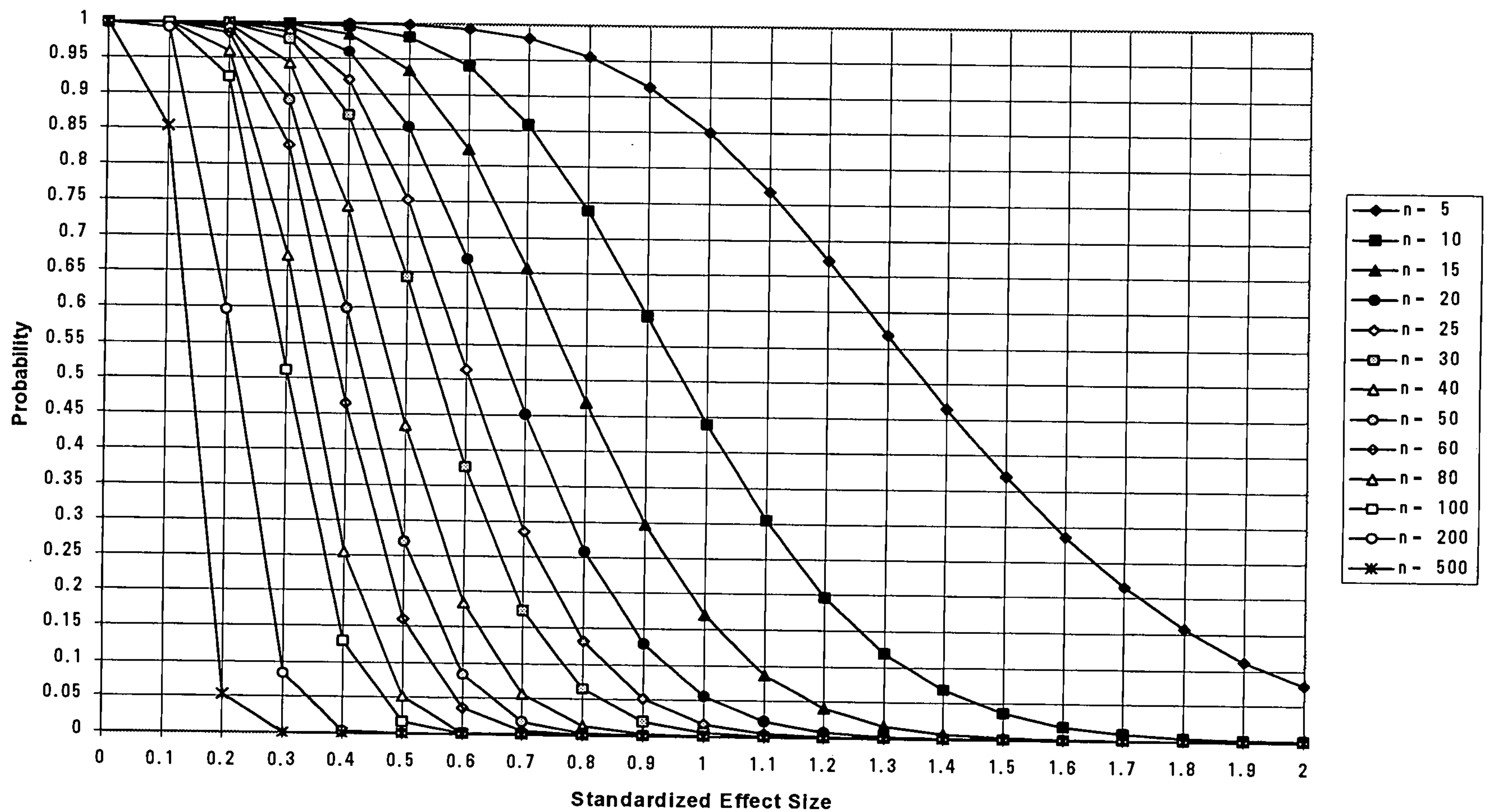

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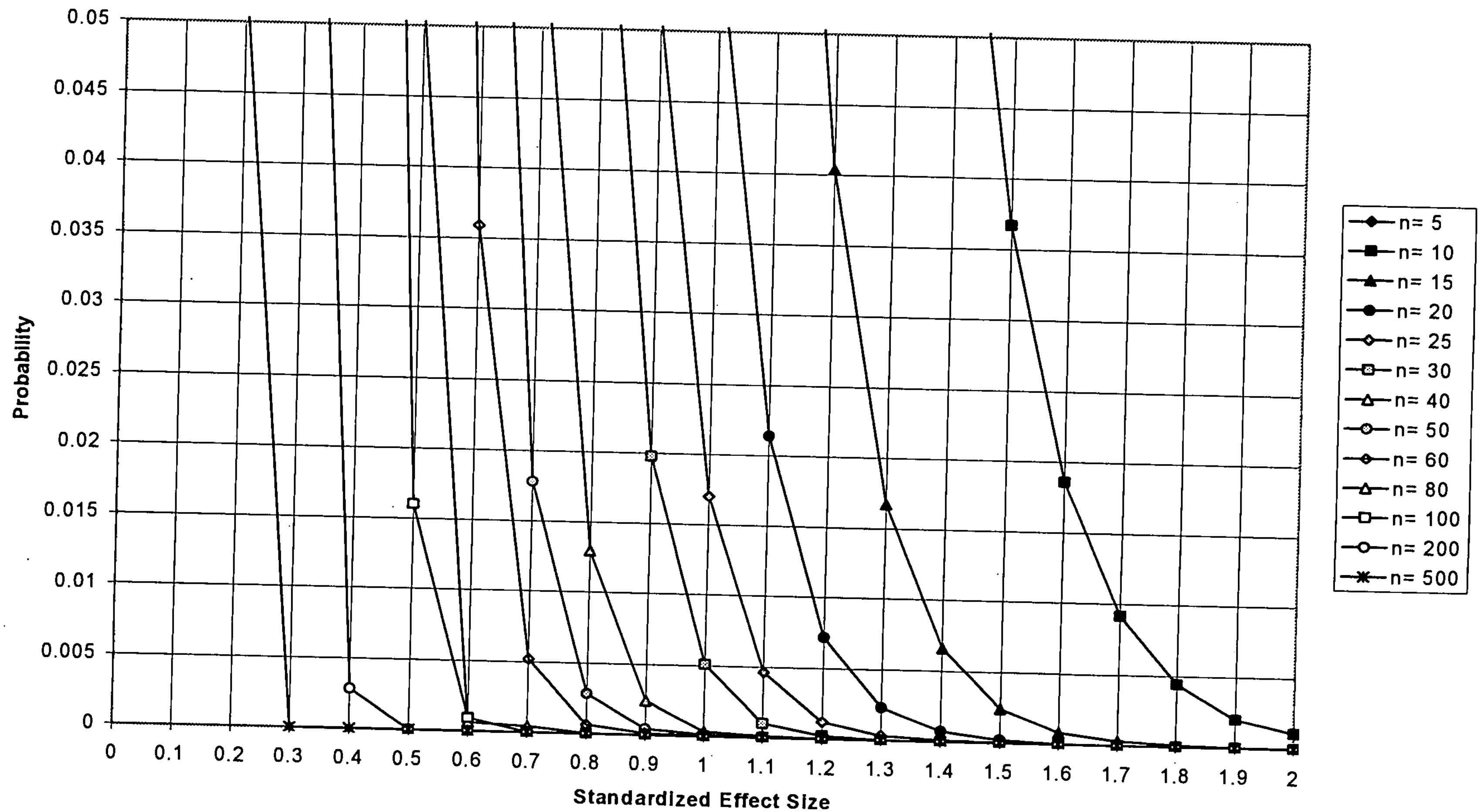
Figure 14. Protected Probability, Alpha= .05, K= 10



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